State attachment variability across distressing situations in middle childhood

Verhees, Martine W. F. T.; Ceulemans, Eva; IJzendoorn, Marinus H.; Bakermans Kranenburg, Marian J.; Bosmans, Guy

published in
Social Development
2020

DOI (link to publisher)
10.1111/sode.12394

document version
Publisher's PDF, also known as Version of record

citation for published version (APA)
Verhees, M. W. F. T., Ceulemans, E., IJzendoorn, M. H., BakermansKranenburg, M. J., & Bosmans, G. (2020). State attachment variability across distressing situations in middle childhood. *Social Development*, *29*(1), 196-216. https://doi.org/10.1111/sode.12394

Received: 22 November 2018 | Revised: 2 July 2019 | Accepted: 4 July 2019

DOI: 10.1111/sode.12394

ORIGINAL ARTICLE

WILEY

State attachment variability across distressing situations in middle childhood

Martine W. F. T. Verhees[1] | Eva Ceulemans[2] | Marinus H. van IJzendoorn[3,4] | Marian J. Bakermans-Kranenburg[5] | Guy Bosmans[1]

[1]Parenting and Special Education Research Unit, KU Leuven, Leuven, Belgium

[2]Quantitative Psychology and Individual Differences Research Unit, KU Leuven, Leuven, Belgium

[3]Department of Psychology, Education and Child Studies, Erasmus University Rotterdam, Rotterdam, The Netherlands

[4]Primary Care Unit, School of Clinical Medicine, University of Cambridge, Cambridge, UK

[5]Clinical Child and Family Studies, Vrije Universiteit Amsterdam, Amsterdam, The Netherlands

Correspondence
Martine W. F. T. Verhees, Parenting and Special Education Research Unit, KU Leuven, Leopold Vanderkelenstraat 32, Leuven 3000, Belgium.
Email: martine.verhees@kuleuven.be

Funding information
Fonds Wetenschappelijk Onderzoek, Grant/Award Number: G.0774.15

Abstract

Contemporary research suggests that attachment has both a trait-like, stable component, and a state-like component that varies across contexts. In the current study, we assessed state attachment variability across comparably distressing situations in middle childhood. In two samples, children reported their expectations of maternal support in each situation. Additionally, we administered trait attachment and psychological well-being measures. Results indicated that, overall, children varied in their expectations across situations: more than half of the variance was explained by intra-individual differences across situations. Results revealed two components underlying variability: a Signal-and-Support component reflecting expectations of support-seeking and receiving, and a Back-on-Track component reflecting expectations of stress reduction and comfort. State attachment variability was related to individual differences in trait attachment: children who are more securely attached at the trait level, overall appear to vary less in their state attachment, likely due to their high mean state attachment scores across situations. When the mean state attachment scores are accounted for, more securely attached children seem to vary more, suggesting that their state attachment expectations are more sensitive to contextual fluctuations. Importantly, degree of state attachment

variability explained psychological well-being over and above trait attachment.

KEYWORDS
attachment, intra-individual variability, middle childhood, secure base script, well-being

1 | INTRODUCTION

Traditionally, attachment was considered an enduring, trait-like construct that hardly fluctuates across time and contexts (Bowlby, 1969, 1980). More recently, however, scholars have started to approach attachment from a more dynamic, state-like perspective, focusing on individual's "at-the-moment" attachment expectations and suggesting that attachment expectations are sensitive to context (Fraley, 2007; Kobak & Bosmans, 2018). The first few studies into state attachment variability indicate that expectations of trust in caregiver support are immediately sensitive to experiences of support and conflict with the attachment figure (Bosmans, Van de Walle, Goossens, & Ceulemans, 2014; Vandevivere, Bosmans, Roels, Dujardin, & Braet, 2018). As these studies focused on state attachment variability across contexts with different situational characteristics, to date it remains largely unclear (a) whether state attachment fluctuations can also occur across contexts with similar situational characteristics, that is, across a variety of distressing situations, (b) whether state attachment variability has a unidimensional structure (i.e., expectations of overall trust vs. no-trust in caregiver support) or comprises different components (e.g., expectations about support seeking, expectations about the effectiveness of support), (c) how degree of state attachment variability is associated with more general, trait-like attachment expectations, and (d) how state attachment variability is associated with psychological well-being.

1.1 | Attachment as a trait

Bowlby (1969) theorized that parental support is vital for trust development, as children's experiences of parental support are cognitively stored in internal working models (IWMs). Children who experience frequent sensitive and responsive parental behavior become securely attached and their IWMs reflect trust that they can turn to their caregivers for support as a strategy for regulating distress or discomfort (Ainsworth, Blehar, Waters, & Wall, 1978; Dujardin et al., 2016). When children experience recurrent insensitive and unresponsive caregiving, they become insecurely attached and their IWMs reflect lack of trust in parental support (Ainsworth et al., 1978). Two patterns of insecure attachment expectations are typically distinguished. The more anxiously attached children expect no consistent effective support from their parents, or only when attachment signals are maximized. The more avoidantly attached children have the expectation that it is best not to rely on the parent for help in times of distress (Main, Kaplan, & Cassidy, 1985). Although restructuring of IWMs can take place, for instance because of changes in the child's environment, IWMs, and related attachment expectations were suggested to tend to remain stable (Bowlby, 1980).

It has been proposed that IWMs can be conceptualized as a set of expectations linked with cognitive schemas and scripts (Bretherton, 1987). Cognitive scripts are knowledge structures that summarize similar causal-temporal event sequences (including for instance main characters, their actions and the event's ending) across a variety of script-relevant situations (Abelson, 1981; Schank, 1999). IWMs of securely attached individuals have been linked to a specific cognitive script: the secure base script (SBS; Waters & Waters, 2006). The SBS comprises an if-then proposition reflecting multiple expectations of what happens when distress or discomfort is encountered. These expectations can be structured in three main blocks: if a child is in a distressing situation, then (a) (s)he seeks support from the parent and/or signals for intervention by the parent; (b) the parent is available, and provides help and

support; (c) as a result, the child experiences stress reduction, relief, and comfort (Waters, Bosmans, Vandevivere, Dujardin, & Waters, 2015; Waters & Waters, 2006). Script theory suggests that because scripts have a causal-temporal nature, the SBS is acquired as a complete entity. The SBS is proposed to get activated and generate generalized expectations that reflect the content and structure of the entire script in a wide range of script-relevant situations (Waters & Waters, 2006). Moreover, cognitive scripts are linked to biases in the processing of script-relevant information, which increase the likelihood that script-congruent information is encoded at the expense of script-incongruent information (Beck, 1964). It has been proposed that secure attachment-related information processing biases maintain expectations of trust in parental support, thereby enhancing stability of attachment expectations (e.g., Bretherton, 1985; De Winter, Bosmans, & Salemink, 2017). In all, attachment theory in general and the SBS hypothesis in particular propose that SBS-related expectations are largely stable across contexts.

1.2 | State attachment (variability)

Contrary to these theoretical expectations, some research shows that there is considerable intra-individual variation in attachment expectations (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Groh et al., 2014), even within the relationship with a specific attachment figure (Girme et al., 2018). These findings indicate the need for a more dynamic model of attachment that can account for variability in attachment expectations. Accordingly, it has been proposed that attachment consists both of trait-like and state-like components. That is, general tendencies in attachment expectations exist that are relatively stable over time—the trait component—but there are also intra-individual, contextualized, differences in attachment expectations—the state component (Fraley, 2007; Gillath, Hart, Noftle, & Stockdale, 2009).

First empirical research on attachment states indeed suggests that attachment expectations are sensitive to contextual changes. In adults, activating an insecure attachment context (i.e., have participants recall an occasion during which they felt unloved or not respected by their attachment figure) temporarily decreased secure state attachment toward the romantic partner (Bosmans, Bowles, Dewitte, De Winter, & Braet, 2014). A study in children in which availability of mother during distress was experimentally manipulated, showed that children's state trust in mother significantly decreased when mother was not available for providing support (Vandevivere et al., 2018). Moreover, a daily diary study in middle childhood showed that children's state attachment was linked to context: the experience of a conflict with mother was associated with less secure attachment appraisals that day as compared to days on which children had not experienced any conflict with their mother (Bosmans, Van de Walle et al., 2014).

In short, there is evidence for immediate reactivity of attachment expectations following (the recall of) an experience with an attachment figure. However, as these studies focused on differences between contexts with opposing characteristics (i.e., support vs. no-support, conflict vs. no-conflict), it remains unclear whether attachment expectations can also vary across contexts with similar situational characteristics. A useful framework for conceptualizing this variability can be found in personality research, where contemporary research suggests that personality states can vary across similar contexts, and that degree of this within-context state variability is meaningfully related to differences in personality traits in a distinct way from variability across different contexts (Geukes, Nestler, Hutteman, Kufner, & Back, 2017). In the remainder of this article, we use the term state attachment variability to refer to variability within a class of situations with similar situational characteristics (Geukes et al., 2017), in our case, the experience of a stressor.

To our knowledge, no research has assessed state attachment variability. Therefore, we had two overarching research objectives: (1) explore state attachment variability, and (2) assess correlates of inter-individual differences in degree of state attachment variability. Both objectives comprised two specific research aims. Concerning objective (1), the first aim was to explore whether, overall, children vary in their SBS-related expectations across a variety of SBS-relevant, that is, distressing, situations (Vandevivere, Braet, & Bosmans, 2015). Evidence in favor of variability of SBS-related expectations across distressing situations would further challenge the conceptualization of attachment as a rather stable trait and the proposition that expectations generalize over situations (Bowlby,

1980; Waters & Waters, 2006). The second aim was to uncover what structure of SBS-related expectations underlies state attachment variability across participants. Because script theory proposes that the SBS is acquired as a complete entity, one would expect that the structure underlying variability is unidimensional. However, this hypothesis remains untested to date.

Concerning objective (2), degree of state attachment variability may reflect an important inter-individual difference (Geukes et al., 2017). Therefore, the third aim of the current study was to explore whether degree of state attachment variability is meaningfully linked to individual differences in more general (trait) attachment measures. Based on the SBS proposition and related information processing biases, one could expect that more securely attached children show less state attachment variability. Finally, the fourth aim was to assess whether degree of state attachment variability can help explain individual differences in psychological well-being. While ample research has shown that individual differences in trait-like attachment measures are relevant for psychological functioning (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012), research into the relationship between state attachment variability and well-being has been scarce. In general, predictions and findings regarding the direction of the relationship between variability and psychological functioning have been contradictory across and within different research domains (e.g., self-concept, Campbell, Assanand, & Paula, 2003; emotions, Houben, Van Den Noortgate, & Kuppens, 2015). Variability can be adaptive as it allows flexible responses to contextual fluctuations, but it might also be maladaptive as it may indicate incoherence and inability to ground oneself in core beliefs and expectations. However, no research to date assessed whether and how state attachment variability is associated with child psychological well-being.

1.3 | Current studies

To provide insight into state attachment variability, we administered a task in which children rated 18 different SBS-related expectations in eight situations describing age-appropriate stressors (Vandevivere et al., 2015): the SBS Consistency test (SBSC). In two separate studies we focused on middle childhood (age range: 9–13 years) and the mother-child attachment relationship. Middle childhood is an interesting period to examine attachment-related cognitive processes as research indicates the occurrence of substantial SBS learning in this age period (Waters et al., 2019), as well as more general developments in cognitive, social, and biological functioning that are likely to lay the foundation for (mal)adaptation throughout adolescence (Bosmans & Kerns, 2015; Del Giudice, 2015). Moreover, although multiple caregivers can be important attachment figures at this age, in the current studies we focused on expectations regarding mother because the mother-child relationship is often the primary attachment relationship in middle childhood (Grossmann, Grossmann, Kindler, & Zimmermann, 2008; Kerns, Tomich, & Kim, 2006).

To explore whether children overall vary in their SBS-related expectations across a range of distressing situations (aim 1), we assessed the proportion of variance in the data that was determined by intra-individual differences, that is, within participants across situations and not by mean differences between individuals (Study 1 and 2). As per aim 2, to assess the common underlying structure of intra-individual variation across situations and across participants, we used multi-level simultaneous component analysis with invariant pattern constraints (MLSCA-P; Ceulemans, Wilderjans, Kiers, & Timmerman, 2016; Timmerman, 2006). MLSCA partitions the two-level data (situations nested within participants) into a between part (the mean score of each child across situations) and a within-part (the child-specific situational deviations from those mean scores). Next, the between and within parts are separately analyzed with principal component analysis. For the current research aim 2 we were interested in the within-part of the data, and the associated within-components that reveal the covariation structure of the attachment expectations across the participants and situations, after between-person differences in means have been removed.

For aims 3 and 4, we focused on inter-individual differences in state attachment variability. Specifically, we used (relative) standard deviations of the state attachment scores per participant across situations as an index of

how much a participant varied across situations. Additionally, we administered more general, trait attachment measures (Study 1 and 2) and a measure of child psychological well-being (Study 2). This way, as per aim three, we could examine associations between the state attachment variability index derived from the SBSC and established general trait attachment measures (in specific: attachment questionnaires measuring trust, attachment avoidance and attachment anxiety, and the attachment script assessment, ASA, measuring SBS knowledge). Moreover, as per aim four, we explored the incremental validity of state attachment variability in the explanation of psychological problems over and above established trait-like attachment measures. We additionally included indicators of verbal competence (Study 1 and 2) and socially desirable responding (Study 2), to allow controlling for these variables in the analyses.

2 | STUDY 1

2.1 | Methods

2.1.1 | Participants

The sample consisted of 118 participants (60 boys, 58 girls) between the ages of 9 and 13 years (M = 10.91; SD = 1.01). Most of the participants had cohabitating parents (79.7%), 16.9% had separated parents, 3.4% had a deceased parent. Regarding nationality, 51.7% of the participants had the Belgian nationality, 45.8% had the Dutch nationality, and 2.5% had a different nationality (1 German, 1 Chinese, 1 Somali).

2.1.2 | Procedure

Participants were recruited by distributing informative letters at elementary schools in Belgium and the Netherlands. In total, 470 letters were distributed and 118 parents replied and gave their active informed consent (response rate: 25.1%). At the start of the procedure, informed consent was also obtained from the children. The procedure consisted of two parts: an individual part during which children participated in the ASA and the verbal IQ subtests; and a collective part during which the children completed the trait attachment questionnaires and SBSC. As part of a larger study, children completed one additional questionnaire subscale measuring self-perceived social acceptance (Veerman, Straathof, Treffers, Van den Bergh, & Ten Brink, 1997). The order of administration of the individual and collective part varied (51% of the participants first participated in the collective part and then in the individual part; 49% vice versa). For the collective part, participants were seated in a classroom and completed the questionnaires, which lasted approximately 40 min. One child reported on her adoptive mother, the remaining 117 children reported on their biological mother. Participants were asked to work individually and to read and answer every item carefully. Research assistants were present to answer any questions. During the individual part, a research assistant administered the ASA and the verbal IQ tests, which lasted approximately 30 min. The procedure was approved by the Social and Societal Ethics Committee KU Leuven.

2.1.3 | Materials

State attachment variability

To assess participants' SBS-related expectations across distressing situations, the SBSC was administered. The SBSC consists of eight situations describing events that can activate the attachment system in middle childhood (see Appendix 1). The situations were derived from a study in which children were asked to report on a distressing experience during which they needed maternal support (Vandevivere et al., 2015). Vandevivere et al. (2015) distinguished seven situational conditions which elicit the need for maternal support in middle childhood (e.g., social conflict, academic failure). In two pilot studies (total N = 151), 16 situations were selected such that all situational

conditions were included. In these pilot studies, we asked children how bad they would feel about being in the situations on a Likert scale ranging from 1 (*not bad at all*) to 7 (*very bad*). For the current SBSC measure, we selected the eight situations that children indicated to be most distressing (average scores for the selected situations ranged from 4.06 to 6.48), while still retaining all situational conditions. We decided to assess expectations in eight situations in the current measure in order to not overburden the participants, while still gathering sufficient data to allow for MLSCA-P analyses.

Participants were instructed to imagine that they experienced the situations themselves. After they read a situation, participants indicated to what extent they expected different scenarios to happen for every situation on a Likert scale ranging from 1 (*would not happen at all*) to 7 (*would definitely happen*). The items were arranged in three blocks, comprising the three components of the SBS (Waters & Waters, 2006): block 1 concerns the participant's expectations about seeking of or signaling for maternal help and support; block 2 concerns the beliefs about mother's availability and support; and block 3 refers to expectations regarding stress relief and comfort as a result of maternal support. For each SBS block, six different expectations were formulated, of which three were SBS-congruent (e.g., "My mom gives advise on how I can handle it [the situation]") and three were not SBS-congruent (e.g., "My mom does not do anything because she is too busy with other things"). The SBSC questions and answer items can be found in Table 1. Additionally, children indicated for every situation how bad they would feel about experiencing the situation on a Likert scale ranging from 1 (*not bad at all*) to 7 (*very bad*) and whether they ever experienced the situation (*yes/no*).

Trait attachment measures

Trust in maternal support. The Trust subscale of the People In My Life questionnaire (PIML; Ridenour, Greenberg, & Cook, 2006) was administered to measure participants' trust in maternal support. The PIML has been shown to be a valid self-report measure in middle childhood (Ridenour et al., 2006). For the current study, only the items focusing on mother were used. These items concern experiences of mother being a trustworthy source of support (10 items; e.g., "I can count on my mother to help me when I have a problem"). Participants responded on a Likert scale ranging from 1 (*almost never true*) to 4 (*almost always true*). In the present study, Cronbach's α was .85 for the Trust subscale.

Anxious and avoidant attachment. A brief version of the Experiences in Close Relationships scale—Revised Child version (brief ECR-RC; Brenning, Van Petegem, Vanhalst, & Soenens, 2014) was administered to measure participants' insecure attachment styles. The abridged ECR-RC consists of 12 statements assessing attachment on two dimensions: Attachment anxiety and Attachment avoidance. Participants rated the items for their relationship with mother. Attachment anxiety was measured with six items concerning physical or emotional fear of abandonment (e.g., "I'm worried that my mother might want to leave me"). Attachment avoidance was measured with six items concerning discomfort with closeness and self-disclosure (e.g., "I don't like telling my mother how I feel deep down inside"). The items were rated on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). In the present study, Cronbach's αs were .84 and .75 for Attachment anxiety and Attachment avoidance, respectively.

SBS knowledge. The middle childhood version of the ASA (Waters et al, 2015) was administered to assess children's SBS knowledge. In the ASA task, children are provided with word outlines containing 12 prompt words divided over four columns, suggesting a beginning, middle and ending of a potential story. Children are instructed to tell a story using these prompt words as if the story is about themselves. After two practice stories, children tell three attachment-related stories (Scary dog in the yard, At the beach, and Soccer game). The order of these stories was varied. Embedded in the story outlines are distress and the opportunity for mother and child to respond in accordance with the SBS. The stories are audiotaped and transcribed, after which they are scored in terms of SBS knowledge on a scale from 1 (inconsistent with the SBS) to 7 (rich in SBS content). Higher scores thus point to more elaborate SBS-congruent content. For the current study, stories were double coded by two trained coders who were blind to participants' scores on the other measures. Interrater agreement

TABLE 1 Normalized MLSCA-P Loadings for Study 1 and Study 2

		Study 1		Study 2	
SBS block & question	Answer item	Component 1 (Signal-and-Support)	Component 2 (Back-on-Track)	Component 1 (Signal-and-Support)	Component 2 (Back-on-Track)
1. What would you do in this situation?	I go to my mom	**.70**	.03	**.70**	.08
	I let my mom know that I am not okay	**.66**	−.11	**.67**	−.14
	I resolve it on my own	**−.67**	.05	**−.67**	.13
	I do not do anything.	**−.32**	.05	**−.35**	−.02
	I tell my mom	**.74**	.10	**.72**	.08
	I keep my feelings to myself	**−.57**	.11	**−.56**	−.08
2. What would your mom do in this situation?	Mom is too busy with other things	**−.33**	.02	**−.37**	−.15
	Mom says it is my own problem and I have to learn to deal with it by myself	**−.45**	.03	**−.46**	−.09
	Mom tells me that everything will be okay	**.27**	.11	**.40**	−.07
	Mom gives advice on how I can handle it	**.32**	.00	**.38**	−.08
	Mom tries to resolve it for me.	**.52**	.06	**.41**	.00
	Mom does not notice anything	**−.32**	−.09	**−.34**	−.01
3. How do you feel afterwards?	I still do not know what to do	−.08	**−.46**	.03	**−.43**
	I feel happy again	.01	**.75**	−.01	**.75**
	Thanks to my mom, I do not worry anymore	.19	**.48**	.15	**.57**
	It is easier to do something else again	−.02	**.72**	.04	**.68**
	I keep worrying about it	.10	**−.71**	.15	**−.61**
	I feel alone	.00	**−.63**	.08	**−.59**

Note: Bold numbers represents the highest loading of the item on the components.
Abbreviation: SBS = secure base script.

was established by separately rating the same ASA stories for 30 participants from the current sample. ICCs were calculated in SPSS using the two-way mixed model and absolute agreement for average measures. ICCs were respectable to very good (ICCs ranged between .73 and .93). After establishing sufficient interrater reliability both coders rated all of the remaining stories separately, all stories were thus double coded. For most stories (83%) the raters differed less than one point in their score and the mean score of the two raters was used for further analyses. Stories on which scores between the raters differed one point or more (17% of the stories) were discussed to consensus. The internal consistency of the three stories was acceptable (α = .73).

Verbal competence. As an estimate of children's verbal competence, we administered two verbal IQ subtests of the Dutch Wechsler Intelligence Scale for Children—Third Edition (Kort et al., 2005): vocabulary (in which the child defines the meaning of words) and similarities (in which the child explains how two things are similar). For both subtests, raw scores were converted to scaled scores. The sum of scaled scores was transformed into an IQ score (Sattler, 1992), which we used as an index for verbal competence.

2.2 | Results

2.2.1 | Preliminary analyses

In total, 0.1% of the data was missing. For the PIML, ECR, and ASA, missing data were imputed using Expectation Maximization. For SBSC, situations with missing data were not included. All participants had a minimum of five situations remaining (M = 7.95, SD = 0.36) and these data were used for the MLSCA-P analyses. Overall, children considered the majority of SBSC situations at least mildly distressing. Specifically, when asked how bad they would feel about being in the situation children indicated at least "4" on the scale ranging from 1 (*not bad at all*) to 7 (*very bad*) in 85% of the situations (with mean scores per situation ranging from 4.34 to 6.64).

2.2.2 | State attachment variability

We used the freely downloadable software package described in Ceulemans et al. (2016) to perform the MLSCA-P analyses. The data and syntax files for these analyses for both studies are available at osf.io/u5fjc (Verhees, Ceulemans, Van IJzendoorn, Bakermans-Kranenburg, & Bosmans, 2019). The SBSC data were centered and scaled across participants (i.e., each variable had a mean of 0 and a variance of 1 across all participants) and split in a between- and a within-part. The between-part consists of the mean scores of each child across the situations and the within-part of the child-specific situational deviations from their respective mean scores. The ratio of the sum of squares of the within-part of the data across all variables and the total sum of squares computed before splitting the data (SSQwithin/SSQtotal) expresses the proportion of variance in the data that was determined by intra-individual differences, that is, within participants across situations. Of the total variance present in the SBSC data, 55.4% was situated at the within-level, indicating that more than half of the variance was explained by differences within individuals across situations (and not by mean differences between individuals). To examine this intra-individual variability, we focused on the component analyses of the within-part of the data. We fitted models with 1–5 components to allow selection of the optimal number of components. The model with two components (obliquely rotated) was selected because this model offered the best balance between amount of variance accounted for and complexity (i.e., number of components) according to the CHull heuristic (Ceulemans, Timmerman, & Kiers, 2011). Together these two components explained 32.0% of the variance.

The normalized loadings of the MLSCA-P analysis are presented in Table 1. The loading matrix expresses sources of intra-individual variability, that is, it reveals the structure of the attachment expectations across the participants and the situations. The first component can be labeled the Signal-and-Support component as it was characterized by mostly high loadings on SBS block 1 items reflecting expectations regarding seeking of and

signaling for maternal support and intermediate loadings on items from SBS block 2, reflecting expectations of receiving maternal support (positive loadings for SBS-congruent items, negative loadings for SBS-incongruent items). The second component can be labeled the Back-on-Track component as it was characterized by high loadings on SBS block 3 items reflecting expectations of stress reduction and comfort. This indicates that the items from SBS block 3 also explained variability across situations, although these items did not necessarily covary with the items on SBS block 1 and 2. This conclusion is further confirmed by the finding that the correlation between the component scores across children was .02.

2.2.3 | Individual differences in degree of state attachment variability: Associations with trait attachment

To establish inter-individual differences in the degree to which children vary across distressing situations we computed two scales capturing the variable structure of the two components: Scale 1 is the Signal-and-Support scale that is based on the items concerning SBS block 1 and 2; Scale 2 is the Back-on-Track scale based on the items from the third SBS block. We first reverse-coded the SBS-incongruent items, and then calculated per person, per situation a mean score of the items of the Signal-and-Support scale and the Back-on-Track scale separately. We then calculated per person the mean and SD for both scales across situations. These SDs ("uncorrected SDs") reflect how much children vary across situations. Correlational analyses between these uncorrected SDs and trait attachment are reported in Supplementary file 1. These analyses suggest that children who are more securely and less avoidantly attached at a trait level, showed less state attachment variability. However, how much children can vary is statistically bounded by their mean score, and these analyses do not allow to exclude the possibility that these associations are driven by mean state attachment scores rather than variability effects. Therefore, we also calculated relative SDs (Mestdagh et al., 2018). The relative SD is defined as follows:

$$\text{Relative } SD_i = SD_i / \max$$

where max ($SD_i|M_i$) is the maximum possible SD given the mean score for individual *i*. By taking into account this maximum possible SD, the relative SD aims to extract unique variability information that is independent from an individual's mean score. For the relative SD, values were missing if children showed no variation across situations. This was the case for three children for the Signal-and-Support relative SD and five children for the Back-on-Track relative SD. These cases were pair-wise deleted.

Bivariate correlations between the key variables from Study 1 are reported in Table 2. Age was related to the relative SD for the Back-on-Track scale ($r = -.19$, $p < .04$) and ASA score ($r = .37$, $p < .001$), but controlling for age did not change the correlation between these variables in terms of significance. A gender effect on the ASA reflected higher ASA scores for girls as compared to boys, $t(116) = -2.53$, $p < .02$. Verbal competence score was significantly associated with Trust ($r = .24$, $p < .01$), Attachment anxiety ($r = -.24$, $p < .01$), and Attachment avoidance ($r = -.30$, $p < .01$). Children with cohabitating parents had higher Trust scores than children without cohabitating parents, $t(116) = -2.26$, $p < .03$. However, as gender, verbal competence and family arrangement were not associated with the variability indices, we did not control for these variables in the correlation analyses.

The analyses showed that relative variability on the Signal-and-Support scale was negatively related to Attachment anxiety, indicating that children who were less anxiously attached varied more on the Signal-and-Support scale when the maximum possible variability that can be observed given their mean is taken into account. This correlation remained similar when controlled for the other attachment dimension (attachment avoidance). There were no other significant correlations between the relative SDs for both scales and the trait attachment measures. To exclude the possibility that these effects were still driven by the mean scores, as the relative variability indices do incorporate the mean score, we additionally computed partial correlations controlling for the scale means. Controlling for the means did not change the results in terms of significance, such that attachment anxiety

TABLE 2 Bivariate correlations among the key variables of Study 1 and descriptive statistics for these variables

		1	2	3	4	5	6
1	Relative SD Signal-and-Support scale						
2	Relative SD Back-on-Track scale	.15					
3	Trust	.04	.17				
4	Attachment anxiety	−.19*	.04	−.31**			
5	Attachment avoidance	−.03	−.17	−.65***	.33***		
6	Attachment script assessment	−.16	−.04	.11	−.18	−.11	
M		0.32	0.41	3.64	1.51	2.55	3.56
SD		0.13	0.21	0.41	0.98	1.17	0.71

*$p < .05$; **$p < .01$; ***$p < .001$.

was still significantly negatively related to relative Signal-and-Support variability ($r = -.20$, $p < .04$) and no other significant correlations were found (*r*s between −.12 and .18, *p*s > .07).

The results of Study 1 thus suggested that state attachment variability exists, that there are two separate components underlying state attachment variation: a Signal-and-Support and a Back-on-Track component. Children with more trust and less attachment avoidance overall seemed to vary less in their state attachment across situations as evidenced by the correlations with the uncorrected SDs. However, we cannot exclude the possibility that these associations are driven by mean state attachment scores rather than pure variability effects. When we account for how much children can vary given their mean state score using a relative variability index, results indicate that this unique variability is relevant for trait attachment: the relative variability index for the Signal-and-Support scale was negatively linked to attachment anxiety, suggesting that children who were less anxiously attached varied more in their state attachment across situations. However, Study 1 represented a first test of state attachment variability. Therefore, in Study 2 the design of Study 1 was replicated in an independent sample. Moreover, to explore whether state attachment variability is relevant to understand psychological problems, we added a measure of child psychological well-being in Study 2.

3 | STUDY 2

3.1 | Methods

3.1.1 | Participants

There were 149 participants (52 boys, 97 girls), with ages ranging from 9 to 12 years ($M = 9.97$; $SD = 0.78$). Most of the participants had cohabitating parents (73.8%), 16.1% lived in a one-parent household, 5.4% came from a blended family, 2.0% lived in an adoptive family and 2.7% of the data regarding living situation was missing. Most participants had the Belgian nationality (88.6%), 5.4% had the Dutch nationality, 0.7% had the Polish nationality and 5.4% of the data concerning nationality was missing. Regarding parental education, 38.9% of the mothers had an elementary school or high school degree, 41.6% had a bachelor degree, 14.8% had a master's degree, and 4.7% of the data was missing. Moreover, 43.5% of the fathers had an elementary school or high school degree, 19.5% had a bachelor degree, 14.1% had a master's degree and 22.8% of the data regarding paternal education was missing.

3.1.2 | Procedure

In total, 558 informative letters were distributed at elementary schools in Belgium and 152 parents replied and gave their active informed consent (response rate: 27.2%). However, one participant was absent during data collection and two participants were unable to finish the procedure. Therefore, the final sample consisted of 149 participants. Again, the procedure at school consisted of a collective part and an individual part and administration order was varied (54% of the participants participated first in the collective part, 46% first in the individual part). The collective part (attachment questionnaires and social desirability scale) lasted 45 min on average. The individual part (ASA and child-reported Strengths and Difficulties Questionnaire; SDQ) lasted approximately 20 min. Most of the children reported on their biological mother (98.7%), 1.3% reported on their adoptive mother. As part of a larger study, children kept a daily diary for 14 consecutive days at home and their mothers completed several online questionnaires. Of these mother-reported questionnaires, we only used the SDQ in the present study. The procedure was approved by the Social and Societal Ethics Committee KU Leuven.

3.1.3 | Materials

Attachment questionnaires

As in Study 1, the SBSC, PIML Trust subscale and the abridged ECR-RC were administered. Cronbach's αs in the present study were .79, .86, and .64 for the Trust, Attachment anxiety, and Attachment avoidance subscales, respectively.

Attachment script assessment

Stories were double coded by four trained coders who were blind to participants' scores on the other measures. The same 30 ASA stories were independently rated by all four coders to establish interrater agreement. ICCs between the coders were respectable to excellent (ICCs ranged between .72 and .94). After establishing interrater agreement, two coders separately rated one half of the remaining stories, and the other two coders separately rated the other half, so that all stories were double coded. For 86.3% of the stories, coders differed less than one point in their score and the mean score of the two raters was used for further analyses. Otherwise, stories were discussed to consensus. The internal consistency of the three stories was acceptable (α = .70).

Strengths and difficulties

Children and their mother respectively completed the child and parent version of the SDQ (Goodman, 1997). The SDQ consists of 25 items measuring social and emotional problems and strengths in children aged 3–16 years (e.g., "(I have) many fears, (I am) easily scared"). Items are scored on a three-point scale ranging from zero to two *(not true*, *somewhat true*, *certainly true)*. Five subscales of five items each are distinguished in the SDQ: emotional problems, peer problems, conduct problems, hyperactivity/inattention problems, and prosocial behavior. The four problems subscales can be combined into two broader scales measuring internalizing problems (subscales emotional problems and peer problems) and externalizing problems (subscales conduct problems and hyperactivity/inattention problems; Goodman, Lamping, & Ploubidis, 2010). In the current study, one item (item 11) from the child-reported internalizing problems scale was removed to increase Cronbach's α. Final Cronbach's αs were .63 (child-report) and .78 (mother-report) for the internalizing problems scale, and .67 (child-report) and .70 (mother-report) for the externalizing problems scale. There were significant correlations between child- and mother-reported internalizing problems (r = .37, p < .001), and externalizing problems (r = .32, p < .001).

Social desirability

Children's tendency to respond in a socially desirable manner regarding their (relationship with their) mother was assessed with a short social desirability questionnaire. This questionnaire consisted of ten items: six target items,

four fillers. The target items concerned statements about the mother-child relationship that are highly unlikely to be true: "My mom is never angry", "If mom asks me to help, I always do so immediately," "I never lie to my mom", "I always immediately go to bed when my mom asks me to," "I like all the food that mom prepares," "I am never mad at my mom." The items were rated on a Likert scale ranging from 1 *(almost never or never true*) to 4 (*almost always or always true*). Since high scores on these items are unlikely to be true, we took higher scores to reflect a higher degree of socially desirable responding. Cronbach's α was .63 in the present study.

Verbal competence

As an estimate of children's verbal competence, we requested AVI-levels from the schools. AVI refers to a Dutch test that assesses reading competence (Jongen & Krom, 2009). The AVI-system is divided into 12 different levels. When schools still used a previous, nine-level version of the AVI-test (this was the case for 44.3% of the received AVI scores), scores were transformed into the 12-level system (Coppens, 2010).

3.2 | Results

3.2.1 | Preliminary analyses

In total, 0.8% of the data was missing. For PIML, ECR, ASA, SDQ_{child}, SDQ_{mother}, and verbal competence (AVI level) missing data were imputed using Expectation Maximization. For SBSC, situations with missing data were not included. All 149 participants had a minimum of 5 situations remaining (M = 7.91, SD = 0.37), and these data were used for the MLSCA-P analyses. Overall, children considered the majority of SBSC situations at least mildly distressing, that is, 87% of the situations were indicated with at least a "4" on a scale from 1 to 7 when asked how bad it would feel to experience the situation (mean scores per situation ranged from 4.17 to 6.61). Children's age was significantly related to Attachment avoidance (r = .17, p < .05). Verbal competence score was related to Attachment avoidance (r = .19, p < .02). Socially desirable responding was associated with Trust (r = .35, p < .001), and Attachment avoidance (r = −.30, p < .001). Mothers reported higher levels of internalizing problems for children without cohabitating (biological) parents as compared to children with cohabitating parents, $t(143)$ = 3.00, p < .01.

3.2.2 | State attachment variability

The SBSC data were centered and scaled across participants and split in a between- and a within-part. We computed the ratio of the sum of squares of the within-part of the data and the total sum of squares: 56.2% of the variance was situated at the within-level, showing that again a large part of the variance in the data was explained by differences within individuals across situations. We then fitted models with 1 to 5 components. The selection of the number of components was again based on the CHull technique, which showed that two was the optimal number of components (in terms of variance accounted for and complexity). Together the two components explained 32.0% of the variance.

The normalized loadings of the MLSCA-P solution for Study 2 are presented in Table 1. Replicating the results of Study 1, we found a Signal-and-Support component that reflected high loadings for items from SBS block 1 and intermediate loadings for items from SBS block 2. Again, the second component can be labeled the Back-on-Track component as it was characterized by high loadings on SBS block 3 items. This indicates that the items of SBS block 3 partly accounted for intra-individual variability across situations, but scores on these items did not necessarily covary with scores on items from SBS block 1 and 2. Again, the correlation between the component scores across children was low (r = .03).

To assess whether the components of the MLSCA-P solutions in Study 1 and Study 2 were similar, we calculated Tucker's coefficient of congruence (Tucker, 1951). Following the suggestions of Lorenzo-Seva and Ten Berge

(2006), the components of Study 1 and 2 can be considered equal (congruence of .99 for the Signal-and-Support component and .96 for the Back-on-Track component). These congruence coefficients indicate that the underlying structure of intra-individual state attachment variation replicated across samples. Study 2 thus provided a cross-validation of the component structure of the SBSC data.

3.2.3 | Individual differences in degree of state attachment variability

Associations with trait attachment

To establish inter-individual differences in the degree to which children vary across distressing situations we computed intra-individual uncorrected and relative SDs for the two scales (Signal-and-Support and Back-on-Track). Results from the analyses with the uncorrected SDs are reported in Supplementary file 1 and suggest that children who are more securely attached at a trait-level, varied less in their state attachment across situations. Like in Study 1, we also performed analyses with the relative SDs. For the relative SDs, values were missing if children showed no variation across situations, which was the case for two children for the Back-on-Track relative SD. These cases were pair-wise deleted. As the relative SDs were not associated with age, verbal competence, socially desirable responding, and family arrangement, and there were no effects of gender on any of the key variables, we did not control for these variables in the analyses. The bivariate correlations among trait attachment measures and state attachment variability are reported in Table 3.

The analyses showed that relative variability on the Signal-and-Support scale was positively related to Trust. Relative variability on both scales was positively associated with ASA scores. Children with more trust and more SBS knowledge thus varied more when the amount of variability possible given their mean is taken into account. There were no other significant correlations between the relative SDs for both scales and the trait attachment measures. When we additionally controlled for children's mean scores on the SBSC using partial correlations, the association between Trust and relative Signal-and-Support variability became non-significant (r = .08, p = .33). Therefore, we cannot be sure that this association truly reflects variability effects rather than mean effects. Nevertheless, the correlations between the ASA score and both the relative Signal-and-Support variability index (r = .21, p < .01) and the Back-on-Track relative variability index (r = .19, p < .03) remained similar after controlling for the mean scale scores, suggesting that these associations do reflect variability effects. The correlations between the other trait attachment measures and the relative variability indices remained non-significant after controlling for the means (*r*s between −.02 and .07, *p*s > .46).

TABLE 3 Bivariate correlations among the key variables of Study 2 and descriptive statistics for these variables

		1	2	3	4	5	6
1	Relative SD Signal-and-Support scale						
2	Relative SD Back-on-Track scale	.47***					
3	Trust	.23**	.12				
4	Attachment anxiety	−.04	−.05	−.29***			
5	Attachment avoidance	−.11	−.14	−.52***	.39***		
6	Attachment script assessment	.22**	.20*	.07	−.10	−.04	
M		0.32	0.36	3.62	1.78	2.55	3.66
SD		0.17	0.19	0.36	1.18	1.04	0.59

*p < .05; **p < .01; ***p < .001.

Associations with psychological problems

To assess the incremental validity of state attachment variability for psychological well-being, we conducted multiple regression analyses with child psychological problems (mother- and child-reported) as outcome and the relative variability and trait attachment measures as predictors. The results can be found in Table 4. The regression models predicted 23.4% and 7.5% of the variance internalizing problems as reported by the child and the mother, respectively. Higher levels of child-reported internalizing problems were associated with lower levels of self-perceived Trust and higher levels of Attachment avoidance, but not uniquely with the relative variability indices. Controlling for the mean SBSC scale scores did not affect these results. The relative variability index for the Signal-and-Support scale was uniquely related to mother-reported internalizing problems, such that higher levels of internalizing problems were related to lower levels of relative variability. When we additionally controlled for the mean scores on the SBSC scales by adding them as predictors in the multiple regression analysis, this association remained similar in terms of direction and significance (β = −.21, p < .04). Moreover, after controlling for the means, relative variability on the Back-on-Track scale almost significantly positively predicted internalizing problems (β = .19, p = .05). Results with the uncorrected SDs are reported in Supplementary file 1 and also indicated that the Signal-and-Support component uniquely negatively predicted mother-reported internalizing problems. Moreover, the uncorrected SD for the Back-on-Track scale positively predicted both child- and mother-reported internalizing problems, over and above the trait attachment measures.

Concerning externalizing problems, the regression models predicted 23.1% of the variance in child-reported externalizing problems; and 4.2% of the variance in mother-reported externalizing problems, respectively. Higher levels of child-reported problems were only significantly associated with lower levels of Trust. None of the trait attachment measures or relative variability indices significantly predicted mother-reports of externalizing problems. Controlling for the mean SBSC scale scores did not affect these results. There were no associations between the uncorrected SDs and child- or mother-reported externalizing problems (see Supplementary file 1).

4 | DISCUSSION

The current studies aimed to shed light on the construct of state attachment variability in middle childhood. Two studies were conducted in which children reported on their secure base expectations across a variety of distressing situations. Results indicated that state attachment variability existed: more than half of the variance was explained by differences within individuals across situations and not by mean differences between participants.

TABLE 4 Beta coefficients from regression analyses including relative variability indices predicting child- and mother-reported child psychological problems

	Internalizing problems		Externalizing problems	
	Child-report	Mother-report	Child-report	Mother-report
Trust	−.21*	.01	−.36***	.05
Attachment anxiety	.13	.09	.15	.08
Attachment avoidance	.25**	.15	.05	.03
Attachment script assessment	−.09	.01	.02	−.13
Relative SD Signal-and-Support scale	−.03	−.21*	.00	−.09
Relative SD Back-on-Track scale	.10	.17	−.08	−.02

*p < .05; **p < .01; ***p < .001.

Moreover, results from both studies revealed a two component structure underlying state attachment variability: a Signal-and-Support component reflecting expectations regarding seeking and receiving maternal support and a Back-on-Track component reflecting expectations regarding stress reduction and comfort. Additionally, degree of state attachment variability was relevant to understand individual differences in more general trait-attachment measures and measures of psychological well-being.

4.1 | State attachment variability

The current studies' findings in favor of state attachment variability add to previous studies that found evidence for state attachment fluctuations (e.g., Bosmans, Van de Walle et al., 2014; Vandevivere et al., 2018). Specifically, we found that SBS expectations can vary within individuals even across contexts with similar situational characteristics, and even when these expectations are assessed at the same point in time. These results challenge the conceptualization of attachment as a mostly stable construct and favor a more dynamic approach to attachment. Additionally, we found two separate state attachment variability components that were uncorrelated across children and situations. More specifically, children's expectations of being "back-on-track," that is, experiencing stress reduction and comfort, were not necessarily related to whether they expected to seek and get maternal support in a situation. This finding contradicts the theoretical assumption that the entire SBS (i.e., all three SBS blocks) should vary together as one entity.

An important note here, however, is that the SBS might still be under development in middle childhood. That is, a recent longitudinal study indicated a substantial increase in SBS knowledge from middle childhood (when participants were 9–12 years old) to (early) adolescence (12–15 years old; Waters et al., 2019). Also in the current studies, ASA scores could reflect that the SBS was not (yet) fully developed in many children. Specifically, average scores on the ASA were 3.56 in Study 1 and 3.66 in Study 2, while scores of 4 or higher are taken to indicate at least some SBS knowledge (Waters & Waters, 2006). Therefore, the finding that two separate components underlie state attachment variability might reflect a developmental phenomenon and future studies in different samples are needed to further elucidate the structure of SBS expectations. Nonetheless, the current results do indicate that SBS expectations are not necessarily an "all-or-nothing" matter and children can have expectations that follow only part of the script. Interesting for clinical purposes, the current evidence in favor of state attachment variability with a multidimensional underlying structure suggests that it might be difficult to estimate a complete and coherent picture of attachment expectations and attachment security in middle childhood, especially when assessment takes place in one situation or at one point in time.

4.2 | Individual differences in degree of state attachment variability

Abundant research has shown that more general, trait-like attachment measures are relevant for understanding psychological functioning (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012). The current results enrich that literature by indicating that degree of state attachment variability is an individual difference that is (a) associated with (some) measures of trait attachment, and (b) has incremental validity in explaining psychological well-being over and above trait attachment measures.

4.2.1 | Associations with trait-like attachment measures

Overall, children who were more securely attached at a trait-level seemed to vary less in their SBS expectations, as reflected in the associations with uncorrected SDs. While these findings fit well with the proposition that more securely attached children develop a SBS and secure information processing biases that maintain expectations of trust in parental support (De Winter et al., 2017; Dykas & Cassidy, 2011), scholars have argued that results with

uncorrected SDs reflect a statistical artifact as how much individuals can vary depends on their mean score (Baird, Le, & Lucas, 2006). Therefore, we cannot interpret these findings as true variability effects, but rather as findings that combine mean state attachment scores and variability across distressing situations. Thus, while these findings cannot speak to pure variability, the results do suggest that children who are more securely attached score more consistently high on their state attachment across distressing situations.

Importantly, when we calculate a relative SD that accounts for individuals' mean state attachment scores and reflects variability effects independent of the mean, this reveals another dynamic in the data: more securely attached children vary more in their state attachment, given how much they can vary based on their mean score. Specifically, results of Study 1 indicated that children who were less anxiously attached varied more as reflected by a higher relative Signal-and-Support SD. Although in Study 2, the relative SD for the Signal-and-Support scale correlated with different trait measures than in Study 1, the overall pattern replicated: children with more secure trait attachment (i.e., more SBS knowledge) had a higher relative SD for the Signal-and-Support scale.

It must be noted here that the relative SDs allow for a slightly different interpretation of variability than the uncorrected SDs, as a higher relative SD for individuals with mean scores at either end of the measurement scale concerns a smaller range than a similar relative SD for individuals with means closer to the middle score of the measurement scale. In the current community samples, there were no children who had mean scores at the lower end of the measurement scale (i.e., minimum mean scores ranged from 1.92 to 4.03 on a scale from 1 to 7). Therefore, the positive associations between trait attachment and relative SDs suggest that children who are more securely attached at a trait level, still show variation, even though their mean state attachment scores are close to the upper bound of the measurement scale. In other words, it seems that more securely attached children are able to ground themselves in the core belief that they can trust in maternal support during distress, but are nevertheless sensitive to minor contextual fluctuations (i.e., they are not rigid; Lichtwarck-Aschoff, Kunnen, & Van Geert, 2009).

This proposition is further supported by the finding that, while children reported high levels of trust (M_{Study1} = 3.64; M_{Study2} = 3.62, where the maximum is 4), a large portion of the variance in the SBSC data was explained by intra-individual variation, indicating that the current samples still showed substantial state attachment variability. This suggests that consistent expectations were not necessarily part of secure trait attachment in the current samples and children with high levels of trust might be able to flexibly evaluate to which extent maternal support is needed and would provide relief in a particular distressing situation.

4.2.2 | Associations with psychological problems

The finding that the current indices of state attachment variability were relevant to understand internalizing problems, over and above the trait attachment measures, suggests that taking into account state attachment variability has incremental value in explaining psychological well-being. The current results are interesting in light of the discussion on how adaptive variability is, that is, whether more variability indicates adaptive flexibility or rather maladaptive incoherence. Uncorrected variability on the Back-on-Track scale uniquely positively predicted internalizing problems (reported by child and mother), suggesting that being consistent in expectations of getting back-on-track after a distressing event is more adaptive than being variable. However, as aforementioned, these findings may not reflect true variability effects. Interestingly, there was some evidence that variability on the Signal-and-Support scale was adaptive. That is, being flexible in requesting and receiving maternal support across situations was related to less child internalizing problems as reported by mother. This effect was found both with the uncorrected and relative SD for the Signal-and-Support scale. However, these findings should be carefully interpreted as they could reflect a Type 1 error due to multiple testing. Furthermore, bivariate correlations between mother-reported internalizing problems and uncorrected variability (r = −.04, p = .61) and relative variability (r = −.14, p = .08) on the Signal-and-Support scale were non-significant, and the effects found in the regression analyses may thus reflect suppression effects.

4.3 | Limitations and future directions

Some limitations regarding the current study designs must be noted. First, we asked children to imagine being in the distressing situations based on vignettes. The use of vignettes may not involve the same experience as real-life situations (Collett & Childs, 2011). Although the current studies specifically aimed to assess state attachment at the level of cognitive representation, which includes expectations of possible events, future research may consider using more experiential methods, for example, experience sampling or experimental procedures, to assess children's expectations when actually experiencing different distressing situations. Moreover, the situational descriptions used in the present studies all included an affect-laden clause to emphasize the distress in the situations. While the emphasis on the distress fits well with the current research questions, the inclusion of these affect-laden clauses may have confounded the purely situational effects and therefore the present results cannot speak to these pure effects on state attachment. It would be interesting for future research to assess state attachment variability across situations without the inclusion of affective clauses, as intra-individual differences in subjective affective responses to the situations may potentially underlie part of state attachment variability.

In addition, children self-reported on their state attachment expectations in distressing situations. This means that we measured the specific, explicit part of state attachment that children can reflect upon. While explicit attachment measures can provide important insight into the attachment construct (Bosmans & Kerns, 2015), the combination of explicit and implicit measures may be needed to provide a more comprehensive picture of state attachment variability across situations. Therefore, besides using experiential designs such as aforementioned, future research should aim to investigate children's actual situational motivational, affective and behavioral responses in various distressing situations by using for instance observational paradigms or interviews.

Another concern regarding the self-reported state attachment expectations could be that the current results are affected by reporter bias. However, the relative SDs were not related to socially desirable responding which speaks against this explanation. Additionally, child-reported state attachment variability was related to mother-reported internalizing problems, further arguing against the concern that the current studies' results mainly reflect reporter bias.

As the current studies indicated that children differ in their degree of state attachment variability, it would be interesting for future research to assess what factors may predict children's state attachment variability. The present results suggest that trait attachment might be such a factor, but it may be relevant for future research to consider additional factors such as for instance children's sensitivity to the environment (Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2007).

4.4 | Conclusion

Despite the abovementioned limitations, the present studies contribute to a better understanding of state attachment. Overall, there was within-person variation in SBS expectations across similar distressing situations. The SBS concept did not necessarily vary as one entity, but rather as a two separate components: one reflecting expectations of seeking and getting maternal support and the other concerning expectations of getting back-on-track after distress. Moreover, degree of state attachment variability as an individual difference feature was relevant for understanding individual differences in trait-like attachment and in psychological well-being. In light of the debate on how to capture variability (Baird et al., 2006), we think the most prudent interpretation of our results is that they support to a limited extent the hypothesis that children with more secure trait attachment are less inclined to vary substantially in their state attachment across situations, but this finding is likely due to their high mean state attachment scores across situations. However, when controlled for the limited statistical margin to vary for these children, their state attachment varies more, suggesting that more securely attached children's state attachment is more sensitive to minor contextual fluctuations.

ACKNOWLEDGMENTS

This work was supported by grant G.0774.15 from Research Foundation Flanders (FWO).

CONFLICT OF INTEREST

The authors declare that they have no competing interests.

DATA AVAILABILITY STATEMENT

The data and syntax files for the multilevel simultaneous component analyses for both studies are available at osf.io/u5fjc.

ORCID

Martine W. F. T. Verhees https://orcid.org/0000-0001-7471-6341

Guy Bosmans https://orcid.org/0000-0001-9057-6027

REFERENCES

Abelson, R. P. (1981). Psychological status of the script concept. *American Psychologist*, *36*, 715–729. https://doi.org/10.1037/0003-066X.36.7.715

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment*. Hillsdale, NJ: Erlbaum.

Baird, B. M., Le, K., & Lucas, R. E. (2006). On the nature of intraindividual personality variability: Reliability, validity, and associations with well-being. *Journal of Personality and Social Psychology*, *90*, 512–527. https://doi.org/10.1037/0022-3514.90.3.512

Baldwin, M. W., Keelan, J. P. R., Fehr, B., Enns, V., & Koh-Rangarajoo, E. (1996). Social-cognitive conceptualization of attachment working models: Availability and accessibility effects. *Journal of Personality and Social Psychology*, *71*, 94–109. https://doi.org/10.1037/0022-3514.71.1.94

Beck, A. T. (1964). Thinking and depression: 2. Theory and therapy. *Archives of General Psychiatry*, *10*, 561–571. https://doi.org/10.1001/archpsyc.1964.01720240015003

Belsky, J., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. H. (2007). For better and for worse: Differential susceptibility to environmental influences. *Current Directions in Psychological Science*, *16*, 300–304. https://doi.org/10.1111/j.1467-8721.2007.00525.x

Bosmans, G., Bowles, D., Dewitte, M., De Winter, S., & Braet, C. (2014). An experimental evaluation of the state adult attachment measure: The influence of attachment primes on the content of state attachment representations. *Journal of Experimental Psychopathology*, *5*, 134–150. https://doi.org/10.5127/jep.033612

Bosmans, G., & Kerns, K. A. (2015). Attachment in middle childhood: Progress and prospects. *New Directions for Child and Adolescent Development*, *148*, 1–14. https://doi.org/10.1002/cad.20100

Bosmans, G., Van de Walle, M., Goossens, L., & Ceulemans, E. (2014). (In)variability of attachment in middle childhood: Secure base script evidence in diary data. *Behaviour Change*, *31*, 225–242. https://doi.org/10.1017/bec.2014.18

Bowlby, J. (1969). *Attachment and loss*, *Vol. 1. Attachment*. New York, NY: Basic Books.

Bowlby, J. (1980). *Attachment and loss: Vol. 3: Loss*, *sadness and depression* (Vol. *III*). New York, NY: Basic Books.

Brenning, K. M., Van Petegem, S., Vanhalst, J., & Soenens, B. (2014). The psychometric qualities of a short version of the experiences in close relationships scale—Revised child version. *Personality and Individual Differences*, *68*, 118–123. https://doi.org/10.1016/j.paid.2014.04.005

Bretherton, I. (1985). Attachment theory: Retrospect and prospect. *Monographs of the Society for Research in Child Development*, *50*, 3–35. https://doi.org/10.2307/3333824

Bretherton, I. (1987). New perspectives on attachment relations: Security, communication, and working models. In J. Osofsky (Ed.), *Handbook of infant development* (pp. 1061–1100). New York, NY: Wiley.

Campbell, J. D., Assanand, S., & Paula, A. D. (2003). The structure of the self-concept and its relation to psychological adjustment. *Journal of Personality*, *71*, 115–140. https://doi.org/10.1111/1467-6494.t01-1-00002

Ceulemans, E., Timmerman, M. E., & Kiers, H. A. L. (2011). The CHull procedure for selecting among multilevel component solutions. *Chemometrics and Intelligent Laboratory Systems*, *106*, 12–20. https://doi.org/10.1016/j.chemolab.2010.08.001

Ceulemans, E., Wilderjans, T. F., Kiers, H. A. L., & Timmerman, M. E. (2016). MultiLevel simultaneous component analysis: A computational shortcut and software package. *Behavior Research Methods*, *48*, 1008–1020. https://doi.org/10.3758/s13428-015-0626-8

Collett, J. L., & Childs, E. (2011). Minding the gap: Meaning, affect, and potential shortcomings of vignettes. *Social Science Research*, *40*, 513–522. https://doi.org/10.1016/j.ssresearch.2010.08.008

Coppens, L. (2010). *AVI binnenstebuiten. Veel gestelde vragen over de nieuwe AVI-procedure in Vlaanderen*. Sint-Niklaas, Belgium: Abimo.

De Winter, S., Bosmans, G., & Salemink, E. (2017). Exploring the causal effect of interpretation bias on attachment expectations. *Child Development*, *88*, 131–140. https://doi.org/10.1111/cdev.12587

Del Giudice, M. (2015). Attachment in middle childhood: An evolutionary-developmental perspective. *New Directions for Child and Adolescent Development*, *148*, 15–30. https://doi.org/10.1002/cad.20101

Dujardin, A., Santens, T., Braet, C., De Raedt, R., Vos, P., Maes, B., & Bosmans, G. (2016). Middle childhood support-seeking behavior during stress: Links with self-reported attachment and future depressive symptoms. *Child Development*, *87*, 326–340. https://doi.org/10.1111/cdev.12491

Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: Theory and evidence. *Psychological Bulletin*, *137*, 19–46. https://doi.org/10.1037/a0021367

Fearon, R. P., Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., Lapsley, A.-M., & Roisman, G. I. (2010). The significance of insecure attachment and disorganization in the development of children's externalizing behavior: A meta-analytic study. *Child Development*, *81*, 435–456. https://doi.org/10.1111/j.1467-8624.2009.01405.x

Fraley, R. C. (2007). A connectionist approach to the organization and continuity of working models of attachment. *Journal of Personality*, *75*, 1157–1180. https://doi.org/10.1111/j.1467-6494.2007.00471.x

Geukes, K., Nestler, S., Hutteman, R., Kufner, A. C. P., & Back, M. D. (2017). Trait personality and state variability: Predicting individual differences in withihn- and cross-context fluctuations in affect, self-evaluations, and behavior in everyday life. *Journal of Research in Personality*, *69*, 124–138. https://doi.org/10.1016/j.jrp.2016.06.003

Gillath, O., Hart, J., Noftle, E. E., & Stockdale, G. D. (2009). Development and validation of a state adult attachment measure (SAAM). *Journal of Research in Personality*, *43*, 362–373. https://doi.org/10.1016/j.jrp.2008.12.009

Girme, Y. U., Agnew, C. R., VanderDrift, L. E., Harvey, S. M., Rholes, W. S., & Simpson, J. A. (2018). The ebbs and flows of attachment: Within-person variation in attachment undermine secure individuals' relationship wellbeing across time. *Journal of Personality and Social Psychology*, *114*, 397–421. https://doi.org/10.1037/pspi0000115

Goodman, A., Lamping, D. L., & Ploubidis, G. B. (2010). When to use broader internalising and externalising subscales instead of the hypothesised five subscales on the strengths and difficulties questionnaire (SDQ): Data from British parents, teachers and children. *Journal of Abnormal Child Psychology*, *38*, 1179–1191. https://doi.org/10.1007/s10802-010-9434-x

Goodman, R. (1997). The strengths and difficulties questionnaire: A research note. *Journal of Child Psychology and Psychiatry*, *38*, 581–586. https://doi.org/10.1111/j.1469-7610.1997.tb01545.x

Groh, A. M., Roisman, G. I., Booth-LaForce, C., Fraley, R. C., Owen, M. T., Cox, M. J., & Burchinal, M. R. (2014). Stability of attachment security form infancy to late adolescence. *Monographs of the Society for Research in Child Development*, *79*, 51–66. https://doi.org/10.1111/mono.12113

Groh, A. M., Roisman, G. I., van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Fearon, R. P. (2012). The significance of insecure and disorganized attachment for children's internalizing symptoms: A meta-analytic study. *Child Development*, *83*, 591–610. https://doi.org/10.1111/j.1467-8624.2011.01711.x

Grossmann, K., Grossmann, K. E., Kindler, H., & Zimmermann, P. (2008). A wider view of attachment and exploration: The influence of mothers and fathers on the development of psychological security from infancy to young adulthood. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (2nd ed., pp. 857–879). New York, NY: The Guilford Press.

Houben, M., Van Den Noortgate, W., & Kuppens, P. (2015). The relation between short-term emotion dynamics and psychological well-being: A meta-analysis. *Psychological Bulletin*, *141*, 901–930. https://doi.org/10.1037/a0038822

Jongen, I., & Krom, R. (2009). *DMT en AVI [DMT and AVI]*. Arnhem, The Netherlands: Cito.

Kerns, K. A., Tomich, P. L., & Kim, P. (2006). Normative trends in children's perceptions of availability and utilization of attachment figures in middle childhood. *Social Development*, *15*, 1–22. https://doi.org/10.1111/j.1467-9507.2006.00327.x

Kobak, R., & Bosmans, G. (2018). Attachment and psychopathology: A dynamic model of the insecure cycle. *Current Opinion in Psychology*, *25*, 76–80. https://doi.org/10.1016/j.copsyc.2018.02.018

Kort, W., Schittekatte, M., Dekker, P. H., Verhaeghe, P., Compaan, E. L., Bosmans, M., & Vermeir, G. (2005). *WISC-IIINL Wechsler Intelligence Scale for Children. David Wechsler. Derde Editie NL. Handleiding en Verantwoording*. Amsterdam, The Netherlands: Harcourt Test Publishers.

Lichtwarck-Aschoff, A., Kunnen, S. E., & Van Geert, P. L. C. (2009). Here we go again: A dynamic systems perspective on emotional rigidity across parent–adolescent conflicts. *Developmental Psychology*, *45*, 1364–1375. https://doi.org/10.1037/a0016713

Lorenzo-Seva, U., & Ten Berge, J. M. F. (2006). Tucker's congruence coefficient as a meaningful index of factor similarity. *Methodology*, *2*, 57–64. https://doi.org/10.1027/1614-2241.2.2.57

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development*, *50*, 66–104. https://doi.org/10.2307/3333827

Mestdagh, M., Pe, M., Pestman, W., Verdonck, S., Kuppens, P., & Tuerlinckx, F. (2018). Sidelining the mean: The relative variability index as a generic mean-corrected variability measure for bounded variables. *Psychological Methods*, *23*, 690–707. https://doi.org/10.1037/met0000153

Ridenour, T. A., Greenberg, M. T., & Cook, E. T. (2006). Structure and validity of people in my life: A self-report measure of attachment in late childhood. *Journal of Youth and Adolescence*, *35*, 1037–1053. https://doi.org/10.1007/s10964-006-9070-5

Sattler, J. M. (1992). *Assessment of children: WISC—III and WPPSI—R supplement*. San Diego. CA: erome M. Sattler.

Schank, R. (1999). *Dynamic memory revisited*. Cambridge, UK: Cambridge University Press.

Timmerman, M. E. (2006). Multilevel component analysis. *British Journal of Mathematical and Statistical Psychology*, *59*, 301–320. https://doi.org/10.1348/000711005X67599

Tucker, L. R. (1951). *A method for synthesis of factor analysis studies* (Personnel Research section Rep. No. 984). Washington, DC: Department of the Army.

Vandevivere, E., Bosmans, G., Roels, S., Dujardin, A., & Braet, C. (2018). State trust in middle childhood: An experimental manipulation of maternal support. *Journal of Child and Family Studies*, *27*, 1252–1263. https://doi.org/10.1007/s10826-017-0954-7

Vandevivere, E., Braet, C., & Bosmans, G. (2015). Under which conditions do early adolescents need maternal support? *Journal of Early Adolescence*, *35*, 162–169. https://doi.org/10.1177/0272431614529364

Veerman, J. W., Straathof, M. A. E., Treffers, P. D. A., Van den Bergh, B., & Ten Brink, L. T. (1997). *Handleiding Competentiebelevingsschaal voor Kinderen (CBSK)*. Lisse, The Netherlands: Swets & Zeitlinger.

Verhees, M. W. F. T., Ceulemans, E., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., & Bosmans, G. (2019). State attachment variability across distressing situations in middle childhood [Data and syntax files]. Retrieved from https://osf.io/u5fjc

Waters, H. S., & Waters, E. (2006). The attachment working models concept: Among other things, we build script-like representations of secure base experiences. *Attachment & Human Development*, *8*, 185–197. https://doi.org/10.1080/14616730600856016

Waters, T. E. A., Bosmans, G., Vandevivere, E., Dujardin, A., & Waters, H. S. (2015). Secure base representations in middle childhood across two Western cultures: Associations with parental attachment representations and maternal reports of behavior problems. *Developmental Psychology*, *51*, 1013–1025. https://doi.org/10.1037/a0039375

Waters, T. E. A., Facompré, C. R., Van de Walle, M., Dujardin, A., De Winter, S., Heylen, J., Bosmans, G. (2019). Stability and change in secure base script development during middle childhood and early adolescence: A three year longitudinal study. Manuscript submitted for publication.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Verhees MWFT, Ceulemans E, van IJzendoorn MH, Bakermans-Kranenburg MJ, Bosmans G. State attachment variability across distressing situations in middle childhood. *Social Development*. 2020;29:196–216. https://doi.org/10.1111/sode.12394

APPENDIX 1. SBSC SITUATIONS

You are being bullied on the playground by some boys and/or girls. Because of the bullying, you feel sad when you go home.
Your dog was very sick. You went to the vet and there the dog got a shot and was put to sleep. It was best for him. This makes you very sad.
You have a conflict with your best friend. He or she suddenly does not want to play with you anymore. You don't understand it at all and you don't know what you did wrong. You feel sad when you go home that day.
You have a math test next week, but you cannot get it right yet. You can already solve some of the exercises, but still you keep making a lot of mistakes. This makes you nervous and you are wondering whether you will pass the test. You want to get good grades.
You are playing in the garden. You are running around with the neighbor children. Suddenly you fall on your knee. There is a hole in your pants and your knee bleeds a little. It hurts a lot. Mom is home but she is inside.
Your grandfather has been very ill for several weeks. Your mum and dad, aunts and uncles visit him a lot. Sometime you go along, sometimes you don't. There is a lot of talking and phone calls, there is little time for other things. You are afraid he will die.
You are shopping with mom in a big supermarket. All of a sudden you do not see her anymore. You start looking for her, but you cannot find her. Suddenly you see her again. You feel very startled.
You and you classmates will go to the library tomorrow. The teacher has asked to bring the books you borrowed back to school. But you lost one book, you cannot find it anymore. You are afraid the teacher will get angry.